NON-PUBLIC?: N
ACCESSION #: 9109050135
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Joseph M. Farley Nuclear Plant - Unit 2 PAGE: 1 OF 3

DOCKET NUMBER: 05000364

TITLE: Reactor Trip Caused By Lightning Induced Transient In the Rod Control System
EVENT DATE: 08/06/91 LER #: 91-005-00 REPORT DATE: 08/30/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: D. N. Morey, General Manager - TELEPHONE: (205) 899-5156
Nuclear Plant

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

At 1704 on 8-6-91, while operating at approximately 100 percent power, a reactor trip occurred. Apparently, a lightning induced transient in the rod control system caused some of the control rods to drop which resulted in a negative flux rate reactor trip.

Testing and inspection of the rod control system revealed no damage. It is postulated that a lightning strike induced voltage on the control rod drive mechanism cables which momentarily de-energized the power supply to one or more rod control cabinets and caused the rods associated with that cabinet or cabinets to drop.

An engineering study has been initiated to determine how to prevent further lightning induced reactor trips.

The unit returned to power operation at 2049 on 8-7-91.

END OF ABSTRACT

Plant and System Identification

Westinghouse - Pressurized Water Reactor
Energy Industry Identification System codes are identified in the text as XX!.

Summary of Event

At 1704 on 8-6-91, while operating at approximately 100 percent power, a reactor trip occurred. Apparently, a lightning induced transient in the rod control system caused some of the control rods to drop which resulted in a negative flux rate reactor trip.

Description of Event

On 8-6-91, the unit was operating at approximately 100 percent power and a severe lightning storm was in progress. At 1704 a reactor trip was initiated due to high negative flux rate as detected by the power range nuclear detectors IG!. The Sequence of Events Log indicated "rods on bottom" just prior to the trip.

Following the trip, the operators implemented FNP-2-EEP-0 (Reactor Trip or Safety Injection) and FNP-2-ESP-0.1 (Reactor Trip Response), ensuring that the unit was safely in Mode 3. The unit was maintained in a stable condition.

The unit returned to power operation at 2049 on 8-7-91.

Cause of Event

This event was caused by a lightning induced transient in the rod control system.

The rod control power cabinets' primary and backup power supplies are diode auctioneered to maintain an uninterrupted power supply of DC power to the power cabinets electronic circuitry. The rod control power cabinets' primary power is supplied by the motor generator sets through a step down transformer. The backup power is supplied from vital power through a surge suppressor. This arrangement is designed to protect the DC power supplies from voltage surges occurring in the AC power supply.

In the bottom of the four rod control power cabinets, the control rod drive mechanism (CRDM) cables physically run parallel to the rod control power cabinets' backup and primary power AC power supply cables. It is postulated that a lightning strike induced voltage on the control rod drive mechanism cables which momentarily de-energized the power supply to one or more rod control cabinets and caused the rods associated with that cabinet or cabinets to drop.

Coincident with the reactor trip, a reactor coolant pump vibration alarm was received on Unit 1 with an indicated value of 22 mils. This alarm was

determined to be spurious and is also attributed to the lightning strike. Also coincident with the reactor trip, several service water instruments and the service water security system experienced electrical failures.

Reportability Analysis and Safety Assessment

This event is reportable because of the actuation of the reactor protection system. After the trip, the following safety systems operated as designed:

- main feedwater was isolated by automatic closure of the flow control valves and bypass valves,
- auxiliary feedwater pumps started automatically and provided flow to the steam generators,
- source range nuclear detectors energized automatically, and
- pressurizer heater and spray valves operated automatically as required to maintain system pressure.

There was no effect on the health and safety of the public.

Corrective Action

Testing and inspection of the rod control system revealed no damage. All power supply voltages were normal and the surge suppressor on the rod control power cabinets backup power supplies was found to be functioning properly. All control rods were exercised several times and the operability of the rod control system was verified per FNP-2-STP-5.0 (Full Length Control Rod Operability Test) and FNP-0-ETP-3643 (Verification of Rod Control System Operability).

An engineering study has been initiated to determine how to prevent

further lightning induced reactor trips.

Additional Information

The unit was returned to power operation at 2049 on 8-7-91.

This event would not have been more severe if it had occurred under different operating conditions.

Due to a lightning induced reactor trip in 1984, a task force was established to determine how to prevent this type of trip from occurring. As a result, in 1986 a surge suppressor was installed on the backup power supply to the rod control cabinets. Until 8-6-91, no reactor trips due to lightning have occurred since the surge suppressor was installed.

The following LER involved a reactor trip due to a voltage surge in the rod control system: 84-004-00 (Unit 2).

ATTACHMENT 1 TO 9109050135 PAGE 1 OF 1

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J. D. Woodard Alabama Power
Vice President-Nuclear
Farley Project the southern electric system

August 30, 1991

10 CFR 50.73

Docket No. 50-364

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Joseph M. Farley Nuclear Plant - Unit 2
Licensee Event Report No. LER 91-005-00

Gentlemen:

Joseph M. Farley Nuclear Plant, Unit 2, Licensee Event Report No. LER

91-005-00 is being submitted in accordance with 10 CFR 50.73. If you have any questions, please advise.

Respectfully submitted,

J. D. Woodard

JDW/BHW:map 0185

Enclosure

cc: Mr. S. D. Ebneter
Mr. G. F. Maxwell

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